

Remarks/Arguments

I. Status of the Claims

In the final Office Action, the Examiner indicated that claims 1, 3-18, 35 and 40-42 are pending and variously rejected claims 1, 3-18, 35 and 40-42 under 35 U.S.C. §103(a).

Claims 2, 19-34 and 36-39 were previously canceled.

Claims 1, 3-18, 35 and 40-42 are pending for reconsideration.

II. Rejection of Claims 1, 4-10, 13-18, 35 and 40-42 under 35 U.S.C. §103(a) Based on the Primary Reference to Ma et al.

At pages 3-4, item 4 of the final Office Action, claims 1, 4-10, 13-18, and 35 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ma et al. (U.S. Patent Application Publication US 2003/0079416 A1).

At pages 6-7, item 7 of the final Office Action, claim 40 is rejected under 35 U.S.C. §103(a) as being unpatentable over Ma et al. (U.S. Patent Application Publication US 2003/0079416 A1) in view of Burton et al. (U.S. Patent No. 6,083,838).

At page 7, item 8 of the final Office Action, claims 41 and 42 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ma et al. (U.S. Patent Application Publication US 2003/0079416 A1) in view of Roberts (U.S. Patent No. 5,723,181).

These rejections are respectfully traversed to the extent that they are maintained. Independent claims 1, 35 and 41 require specific interaction between a surfactant and a substrate that is a glass disk substrate, a ceramic disk substrate, or a glass-ceramic disk substrate for use in a data storage device. With respect to claims 1 and 35, the specific interaction claimed is that the surfactant is adsorbed and/or precipitated onto a surface of at least one of the substrate and the colloidal particles, and that the surfactant has a hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles. With respect to claim 41, the specific interaction claimed is that the surfactant is precipitated onto a surface of at least one of the substrate and the colloidal particles, and that the surfactant has a hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles. The Ma et al. reference fails to disclose or suggest using its chemical mechanical polishing slurry composition and method in the context of providing the specific interaction claimed during superfinishing a surface of a glass disk substrate, a ceramic disk substrate, or a glass-ceramic disk substrate for use in a data storage device (claim 1), or finishing to provide a textured surface of a glass disk substrate, a ceramic disk substrate, or a glass-ceramic disk substrate for use in a data storage device (claim 35), or superfinishing a surface of a glass disk substrate, a ceramic disk substrate, or a glass-ceramic disk substrate for use in a data storage disk (claim 41).

In this regard, the final Office Action states, “the intended use is not given patentable weight, as the composition is capable of doing so.” See, final Office Action, page 2, item 1, lines 12-14. It is, however, impermissible to ignore claim limitations. See, MPEP 2143.03. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 USPQ

580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970).

Moreover, the specific interaction claimed does not necessarily follow, not only because the substrate is different, but also because the composition is different. Independent claims 1, 35 and 41 require the composition to comprise both a surfactant and colloidal particles. However, the Ma et al. reference does not disclose or suggest the use of a surfactant with colloidal particles (its second-step slurry), but only with organic polymeric abrasive (its first-step slurry). See, Ma et al., page 5, paragraphs 0060-0062 and page 6, paragraphs 0068-0072.

In addition, independent claim 35 requires that the colloidal particles have a specified nominal size to provide a textured surface on a disk substrate for use in a data storage device. Texturing is not taught in the Ma et al. reference. The specified nominal size of the colloidal particles (i.e., 70-200 nm) set forth in claim 35 is different than that (i.e., 3-70 nm) taught in the Ma et al. reference. See, Ma et al., page 6, paragraph 0071. Moreover, the colloidal particle teaching of the Ma et al. reference is in the context of polishing a semiconductor wafer -- not texturing a disk substrate. The Ma et al. reference teaches, “[c]olloidal silica, with a narrow size distribution, minimizes scratch defects and provides superior removal rates on barrier materials, greater than 1000A/min, and low removal rates for copper and barrier.” See, Ma et al., page 6, paragraph 0072. Thus, the Ma et al. reference teaches away from the claimed nominal size of the colloidal particles necessary to provide a textured surface on a disk substrate.

Also, independent claim 41 requires the surfactant to be precipitated on a surface of the substrate and/or colloidal particles. The Ma et al. reference does not disclose or

suggest that the surfactant is precipitated on a surface of the substrate and/or colloidal particles. The Roberts patent does not cure this or the other deficiencies in the Ma et al. reference discussed above.

The teaching or suggestion to make the claimed modification and the reasonable expectation of success must be found in the prior art, not applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). With regard to each of the independent claims, the Applicants respectfully submit that the teaching or suggestion to make the claimed modification and the reasonable expectation of success are based on impermissible hindsight gleaned from the applicant's disclosure, not the prior art. It is improper to use the inventor's patent application as an instruction book on how to reconstruct the prior art. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1 USPQ2d 1593 (Fed. Cir. 1987).

Claims 4-10, 13-18 and 40 depend from claim 1, and thus define over the Ma et al. reference for the same reasons discussed above with respect to claim 1. Moreover, these dependent claims set forth additional limitations that are not disclosed or suggested by the cited art.

More specifically, several of these dependent claims recite specific surfactants that are not disclosed with sufficient specificity or reasonably suggested in the Ma et al. reference. Granted, the Ma et al. reference states "[t]he surfactant may be cationic or anionic." See, Ma et al., page 5, paragraph 0060. However, none of the example surfactants given in the Ma et al. reference are those specifically claimed in claims 7, 14, 15, 16 and 40.

For example, claim 7 requires the surfactant to be a quaternary amine surfactant. The Ma et al. reference fails to disclose or suggest a quaternary amine surfactant.

Claim 14 requires the surfactant to be an oxygen containing compound with moieties of ethylene oxide and/or polyvinyl alcohol. The Ma et al. reference fails to disclose or suggest a surfactant that is an oxygen containing compound with moieties of ethylene oxide and/or polyvinyl alcohol.

Claim 15 requires the surfactant to be selected from a group consisting of alkaloids and amines, and combinations thereof. The Ma et al. reference fails to disclose or suggest a surfactant that is selected from a group consisting of alkaloids and amines, and combinations thereof.

Claim 16 requires the surfactant is a polydentate adsorption surfactant. The Ma et al. reference fails to disclose or suggest a surfactant that is a polydentate adsorption surfactant.

Claim 40 requires the surfactant to be an ethylene oxide propylene oxide block copolymer. The Ma et al. reference fails to disclose or suggest a surfactant that is an ethylene oxide propylene oxide block copolymer. While the Burton et al. patent discloses such a surfactant, there is no motivation to combine the references and no reasonable expectation of success found in the prior art.

By such additional limitations, and for the reasons discussed above with respect to independent claim 1, the Applicants respectfully submit that dependent claims 3-18 also patentably define over the prior art.

Claim 42 depends from claim 41, and thus defines over the Ma et al. reference for the same reasons discussed above with respect to claim 41. Moreover, dependent claim 42 requires the surfactant precipitated onto a surface of at least one of the disk substrate and the colloidal particles to be sodium octyl sulfate. The Ma et al. reference does not disclose or suggest using sodium octyl sulfate as the surfactant. While the Roberts patent discloses the use of sodium octyl sulfate as a surfactant, it does not disclose or suggest that the sodium octyl sulfate surfactant is precipitated onto a surface of at least one of the disk substrate and the colloidal particles. Moreover, there is no motivation to combine the references and no reasonable expectation of success found in the prior art. By this additional limitation, and for the reasons discussed above with respect to independent claim 41, the Applicants respectfully submit that dependent claim 42 also patentably define over the prior art.

Therefore, the Applicants respectfully request reconsideration and withdrawal of these rejections of claims 1, 4-10, 13-18, 35 and 40-42 under §103(a).

III. Rejections of Claims 1, 3-18 and 35 under 35 U.S.C. §103(a) Based on the Primary Reference to Hartog et al.

At pages 4-5, item 5 of the final Office Action, claims 1, 3-6, 8-18 and 35 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hartog et al. (U.S. Patent No. 6,236,542) in view of Kramer et al. (U.S. Patent No. 6,630,403).

At page 6, item 6 of the final Office Action, claims 7 and 8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hartog et al. (U.S. Patent No. 6,236,542) in

view of Kramer et al. (U.S. Patent No. 6,630,403) and further in view of Small et al. (U.S. Patent No. 6,251,150).

These rejections are respectfully traversed to the extent that they are maintained. As discussed below, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the primary reference to Hartog et al. or to combine the reference teachings as suggested by the Examiner. Moreover, as discussed below, there was no reasonable expectation of success in modifying the primary reference to Hartog et al. or combining the reference teachings as suggested by the Examiner.

The Hartog et al. patent fails to disclose or suggest a self-cleaning colloidal slurry composition having the specific interaction with a substrate recited in claims 1 and 35. The specific interaction claimed is “a surfactant adsorbed and/or precipitated onto a surface of at least one of the substrate and the colloidal particles, the surfactant having a hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles”.

In the final Office Action, the Examiner admits to this deficiency in the primary reference to Hartog et al. stating, “Hartog et al fail to teach the composition comprises a surfactant that forms a steric hindrance barrier between the substrate and the colloidal particles.” In the final Office Action, the Examiner indicates that this deficiency in the primary reference to Hartog et al. is cured by the secondary reference to Kramer et al. However, the Applicants respectfully disagree.

There is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the primary reference to Hartog et al. or to combine the reference teachings as suggested by the Examiner. The teachings of the Kramer et al. patent referred to by the Examiner are in the context of a reduction of surface roughness of semiconductor wafers in the manufacturing of integrated circuits and other electronic devices. See, Kramer et al., col. 1, lines 14-18 and col. 1, lines 21-28. The teachings of the Kramer et al. reference are not in the context of providing the specific interaction claimed during superfinishing a surface of a disk substrate for use in a data storage device (claim 1) or finishing to provide a textured surface of a disk substrate for use in a data storage device (claim 35). It would not have been obvious to one of ordinary skill in the art to apply teachings of the Kramer et al. patent relating to reduction of surface roughness of semiconductor wafers to the superfinishing polish slurry described in the Hartog et al. patent.

In the final Office Action, the Examiner states, “However, Kramer et al disclose a polishing composition including silica abrasive and surfactant, wherein the surfactant forming particle barrier layer or flow modifiers to reduce roughening on the polished surface in order to reduce scratches and eventually cracking on the polished surface and the reduction of cracking decreases access of cleaning chemistry to underlying structures of the substrate (col.2, lines 1-5 and lines 53-57 and col. 3, lines 13-21 and col. 4, line 66 - col. 5, line 12 and col. 6, lines 55-67).” See, final Office Action, page 4-5, item 5, lines 10-15. There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. In re Rouffet, 47 USPQ2d 1453, 1457-57 (Fed. Cir. 1998). Here, none of the three possible sources for motivation are present. With regard to the first possible source for a motivation, it is important to note that the nature of the

problem to be solved in the Kramer et al. patent by the use of its surfactant. The Kramer et al. patent's teachings are in the context of overcoming a "wormholing" problem that is not presented in the processing of disk substrates. See, Kramer et al., col. 1, line 57 - col. 2, line 9. According to the Kramer et al. patent, "wormholing" can provide channeling of subsequent cleaning chemistries, such as Tetra Methyl Ammonia Hydroxide (TMAH), to underlying metal structures, thus creating metal voids in the integrated circuit. In contrast to semiconductor wafers, disk substrates have no such underlying integrated circuit metal structures in which metal voids may be undesirably formed through "wormholing". It would not have been obvious to one of ordinary skill in the art to apply teachings of the Kramer et al. patent relating to a solution for overcoming the problem of "wormholing" in processing semiconductor wafers to the superfinishing polish slurry described in the Hartog et al. patent for processing disk substrates where "wormholing" is not a problem. Clearly, the nature of the problem to be solved does not provide a source for a motivation to combine references in this case.

Moreover, independent claim 35 requires that the colloidal particles have a specified nominal size to provide a textured surface on a disk substrate for use in a data storage device. Texturing is not taught in either the Hartog et al. patent or the Kramer et al. patent. Although the specified nominal size of the colloidal particles (i.e., 70-200 nm) set forth in claim 35 is included in the broad colloidal particle size (i.e., 1-1000 nm) teaching of the Hartog et al. patent, the broad colloidal particle teaching of the Hartog et al. patent is in the context of superfinishing -- not texturing. The teachings of the Kramer et al. patent, which relate to reduction of surface roughness, would lead one of ordinary skill in the art away from providing a textured surface on a disk substrate.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art, not applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Applicants respectfully submit that the teaching or suggestion to make the claimed combination and the reasonable expectation of success are based on impermissible hindsight gleaned from the applicant's disclosure, not the prior art. It is improper to use the inventor's patent application as an instruction book on how to reconstruct the prior art. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1 USPQ2d 1593 (Fed. Cir. 1987).

The Small et al. patent is cited for allegedly teaching "a composition comprises colloidal particles of silica or alumina (aluminum oxide) having a pH of about 3.8 - 9.4 for maintaining the zeta potential of the slurry composition in order clean or remove the residue efficiently (col. 10, lines 8-15, col. 10, lines 48-51 and col. 11, lines 4-7)." However, the Small et al. patent does not cure the deficiencies in the Hartog et al. and Kramer et al. patents discussed above.

Claims 3-18 depend, directly or indirectly, from independent claim 1, and set forth all of the limitations therein plus additional limitations that are not disclosed or suggested by the cited art.

For example, claim 7 requires the surfactant to be a quaternary amine surfactant. The cited art, including the Kramer et al. patent, fails to disclose or suggest a quaternary amine surfactant.

Claim 14 requires the surfactant to be an oxygen containing compound with moieties of ethylene oxide and/or polyvinyl alcohol. The cited art, including the Kramer

et al. patent, fails to disclose or suggest a surfactant that is an oxygen containing compound with moieties of ethylene oxide and/or polyvinyl alcohol.

Claim 15 requires the surfactant to be selected from a group consisting of alkaloids and amines, and combinations thereof. The cited art, including the Kramer et al. patent, fails to disclose or suggest a surfactant that is selected from a group consisting of alkaloids and amines, and combinations thereof.

Claim 16 requires the surfactant is a polydentate adsorption surfactant. The cited art, including the Kramer et al. patent, fails to disclose or suggest a surfactant that is a polydentate adsorption surfactant.

By such additional limitations, and for the reasons discussed above with respect to independent claim 1, the Applicants respectfully submit that dependent claims 3-18 also patentably define over the prior art.

Therefore, the Applicants respectfully request reconsideration and withdrawal of these rejections of claims 1, 3-18 and 35 under §103(a).

IV. Conclusion

In view of the foregoing comments, the Applicants respectfully submit that all of the pending claims (i.e., claims 1-18, 35 and 40-42) are in condition for allowance and that the application should be passed to issue.

If a conference would be of value in **expediting the prosecution of this application, and possibly avoiding the delay of an appeal process**, the Examiner is hereby encouraged to telephone the undersigned counsel at (847) 462-1937 to arrange for such a conference.

Respectfully submitted,

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